Chandler • Arizona
Where Values Make The Difference

Civil Engineering Grading and Drainage Plan Review Checklist

Log No.: _____

C.I.P. No.: _____

Project:	
Location:	

Legend	
/	Requirement satisfied.
O	Requirement not satisfied.
?	Unable to determine status, more information is required.
X	Not applicable.

Review #	Reviewed By	Date
1		
2		
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The requirements referred to on the checklist can be found in the City's Technical Design Manuals.

Item	Requirement	Comments
1.	The improvement plans must be submitted on 24" x 36" sheets. Please resubmit the plan on the correct size sheets.	
2.	Show the name of the proposed development on the cover sheet.	
3.	Show the developer's name, address, and phone number on the cover sheet.	
4.	Show the engineer's name, address, and phone number on the cover sheet.	
5.	The following City standard notes must be shown, or corrected, on the cover sheet: A. General Notes. B. Grading and Drainage Notes.	

Mailing Address:
P.O. Box 4008, MS 406
Chandler, Arizona 85244-4008

Planning and Development Department
Development Services Division
Civil Engineering Plan Review Section
215 E. Buffalo St., Chandler Arizona

Telephone: (480) 782-3000
Fax: (480) 782-3150
www.chandleraz.gov

Form No. UDM-25/Folder 425
Rev. 12-29-04

Item	Requirement	Comments
6.	Reference all elevations shown on the plans to an approved City benchmark. The City's benchmark ID number (CMCN#) and verbatim description must match the latest edition of *City of Chandler Vertical Control Base List* and must be shown on the cover sheet.	
7.	Add the following approval block to the cover sheet: A. For Capital Improvement Projects: **APPROVED:** **_____** **DIRECTOR OF PUBLIC WORKS DATE** **_____** **CITY ENGINEER DATE** B. For all other projects: **APPROVED FOR COMPLIANCE WITH CITY CODE:** **_____** **CITY ENGINEER DATE** **_____** **DEVELOPMENT SERVICES ENGINEER DATE**	
8.	Please coordinate the plans with all of the appropriate utility companies on the list below. Place a "Utility Coordination Block" on the cover sheet. Show the names of the utility companies and the date plans were submitted to them. Air Products and Chemicals, Inc. Arizona Public Service. AT & T Telephone Long Distance. COX Cable. El Paso Natural Gas. Qwest. Roosevelt Water Conservation District (RWCD). Salt River Project (power). Salt River Project (SRVWUA). Southern Pacific Gas. Southwest Gas. Sprint Telephone Long Distance.	

Item	Requirement	Comments
9.	Place an index map with the following information on the cover sheet: A. Street names. B. Lot, tract and parcel numbers. C. Sheet numbers. D. Phase limits and numbers if applicable. E. Model home area.	
10.	Place a legend identifying the symbols used for the following items on the cover or detail sheet. A. Existing top-of-curb elevations. B. Existing ground elevations. C. Proposed top-of-curb elevations. D. Proposed ground elevations. E. Proposed finished floor and pad elevations. F. Existing contour lines. G. Proposed contour lines. H. Arrows designating direction of drainage flow. I. Drainage structures. J. Grade breaks.	
11.	When temporary retention basins or storm drainage facilities are present, place the following note on the cover sheet: **The existing retention and drainage facilities within this development will not be removed from service until the permanent retention and drainage facilities are functional.**	
12.	Add the following note to the cover sheet: **A retaining wall will be required if at the completion of grading there exists more than one foot of difference in elevation between this site and adjacent properties.**	

Item	Requirement	Comments
13.	The following certifications are required on the cover sheet: **A. GRADE CERTIFICATION:** **This is to certify that this grading plan is in compliance with the grade requirements of the soils report prepared by:** _____ **DATE** _____ **REGISTERED CIVIL ENGINEER DATE** **B. FINISH GRADE CERTIFICATION:** **This is to certify that the finish grades shown or as-built on this grading plan are in compliance with the soils report prepared by:** _____ **DATE** _____ **REGISTERED CIVIL ENGINEER DATE (OR REGISTERED LAND SURVEYOR)**	
14.	Add the following on the lower right of the cover sheet over the title block: **C. O. C. Log No._____**	
15.	Each sheet of the improvement plans must be sealed, with signature, by the engineer preparing the plans.	
16.	The minimum height of all text and lettering shall be 0.1" (one tenth of one inch).	
17.	Place a vicinity or site location map on the cover sheet.	
18.	The grading and drainage plans must encompass the entire development. Show all lots, tracts, and parcels in their entirety.	
19.	Show the limits of the model home area on the plans.	
20.	Provide a quantity tabulation on the cover sheet. See the Certificate of Quantities list for the required items.	
21.	Show north arrows on each sheet.	
22.	Show phase limits and numbers on each applicable sheet.	

Item	Requirement	Comments
23.	Show the scale on the plans; see the City's technical design manuals for requirements.	
24.	Show the existing topography by contours. Spot elevations are required when the subdivision's topography cannot be clearly defined by contours. Spot elevations are required immediately off-site adjacent to the subdivision boundary sufficient to permit analysis of grade differentials and drainage.	
25.	Existing storm drainage facilities such as retention basins, catch basins, scuppers, and storm drain pipes must be shown and identified by type on plans.	
26.	Show existing buildings and other significant structures. If appropriate, note the removal of these items.	
27.	Existing trees within the City right-of-way are to be protected in place or replaced in kind. Contact the City of Chandler Streets Division at 480-782-3494 prior to start of construction.	
28.	Show all wells, streams, canals, irrigation laterals and ditches, lakes and other water features. Note any modifications. Open ditches and canals must be tiled, or landscaped, as specified within the City's technical design manuals.	
29.	Show existing spot elevations for all existing curb and gutter adjacent to the development. Show elevations adjacent to each property corner, at all grade breaks, and at all scuppers/catch basins.	
30.	Identify all portions of the development that are within the FEMA 100-year flood zones. If any such areas exist, submit plans and drainage report to the Flood Control District of Maricopa County. FCDMC approval is required. A. Add the following approval block to the cover sheet: _____ **FLOOD CONTROL DISTRICT OF MARICOPA COUNTY** **DATE** B. Acquire Flood Control District of Maricopa County approval and signature.	

Item	Requirement	Comments
31.	Show a typical lot grading detail on the detail sheet. This detail must satisfy the following requirements: A. The building's finished floor elevation must be at least 14" above the lot's low outfall elevation. B. The lot grading must be sufficiently sloped to prevent stormwater from ponding on the lot. C. The maximum allowable elevation difference between adjacent yard elevations must be less than or equal to one foot. D. Typical swale location and grade.	
32.	Show cross-sections across the development's property line boundaries. The maximum allowable elevation difference between adjacent properties is one foot.	
33.	Show cross-sections for all retention basins. The maximum allowable side slope requirements are 4:1.	
34.	Show the depth of ponding due to the 100-year 2-hour design storm for retention facilities on the retention basin cross-sections. The maximum allowable depth of ponding resulting from the design storm is 3 ft.	
35.	Show construction details, plan and profile views for all proposed drainage facilities, such as: A. Drainage swales. B. Storm drains. C. Scuppers and catch basins. D. Hydraulic profile must be shown. E. Scupper and chute elevations are required. F. When catch basin per M.A.G. Detail No. 533-1 is specified on plans, specify also: 1) Grate per M.A.G. Detail No. 533-3. 2) Curb and gutter transition per M.A.G. Detail No. 532. G. Access barrier with hinges on bottom required at all open ends of pipe 12" or more in diameter.	

Item	Requirement	Comments
36.	Show the following information for each lot: A. Proposed elevations at front lot corners, typically top-of-curb elevations. B. Proposed elevations at rear lot corners. C. Proposed finished pad elevations. D. Proposed finished floor elevations. E. Top and bottom elevations on retaining walls. F. All existing block walls on and adjacent to subdivision boundaries and retention basin perimeters, with top of wall elevations. G. All proposed block walls on subdivision boundaries and retention basin perimeters, with top of wall elevations.	
37.	All catch basin access covers shall be per City of Chandler Standard Detail C-505 and shall be so noted on the plans.	
38.	Provide all percolation test results prior to any grading on the site as a part of the grading and drainage plan review process. Under no circumstances will testing be deferred until after completion of site grading.	
39.	Water lines, fire lines, and water service lines are not allowed to pass under retention basins. This does not apply to irrigation lines downstream of the backflow preventor.	
40.	Please submit (with mylars for final approval) a completed Certificate of Quantities form, signed and sealed by the Civil Engineer.	
41.	Register all proposed drywells with the Arizona Department of Environmental Quality (ADEQ) and submit a copy of the application to the City of Chandler for inclusion in the file. The following requirements also apply: A. Show the City drywell detail on the plans. B. All drywells must conform to the City detail. C. All drywells receiving storm runoff directly from paved areas must have interceptors installed on them. D. Large retention basins (the size of a soccer field) must have all drywells installed along the perimeter.	
42.	A drainage report is required.	

Item	Requirement	Comments
43.	As a minimum, include the following in the drainage report:	
	A. An exhibit delineating each drainage area with the corresponding retention basins, and drainage structures. Provide arrows delineating drainage flow directions.	
	B. A discussion concerning off-site drainage flows and patterns including FEMA flow zones.	
	C. Calculations determining the volume of retention required for each drainage area.	
	D. Calculations showing the volume of retention provided for each drainage area. The volume of retention provided for each drainage area must include the 10% required to account for expected future volume losses.	
	E. Calculations determining the depth of ponding within the retention basins. The depth must include the required 10% noted above.	
	F. A discussion concerning the low outfall elevation for each drainage area, including the effects of an overflow situation. The elevation must be called out in the report and shown on the exhibit.	
	G. Shallow pit percolation test results and retention basin drainage time calculations. If drywells are deemed to be necessary to meet the 36-hour drainage time requirement, the number of drywells must be determined. The drywell design drainage rate cannot exceed 0.1 cfs until percolation test performed on drywell.	
	H. Street hydraulic calculations showing that the 10-year storm runoff is retained within the curbs. Velocities shall be based upon the 10-year full depth.	
	I. Street hydraulic calculations showing that the 50-year storm runoff is retained within 0.3 feet maximum depth over curb.	
	J. Storm drainage inlet and pipe sizing/capacity calculations.	
	K. A discussion concerning the minimum finished floor elevation within the development. This elevation cannot be below the appropriate low outfall elevation noted previously.	
	L. Show all calculations, formulas, and charts used.	

Item	Requirement	Comments
44.	Structural design calculations are required for storm drains and/or equalizing pipes subject to wheel loading.	
45.	Any retaining wall in excess of 48 inches as measured from finish grade to finish grade, any 6' nominal height wall where the maximum exposed height is in excess of 7 feet, all proposed retaining walls which support a surcharge load, and any combination of screen wall in excess of 6' attached to a retaining wall in excess of 48" as measured above must be reviewed by building and safety staff for conformance with the I.B.C. Submit a building permit application, along with two (2) sets of calculations and wall details, to the Building & Safety section for review and approval. Include the following certification on the plans: **I hereby certify that the wall details shown hereon were designed in compliance with the I.B.C., current edition, that they were reviewed by the Building & Safety Section of the Development Services Division and that they conform to that design.** _____ **Registered Civil/Structural Engineer Date**	
46.	Site retaining walls, where the finish grade differential is less than or equal to 48", and combination retaining wall/screen wall where the screen wall is 6' in height or less, and the aggregate height is 10' or less, require the structural details be placed on the civil plans. Particular attention shall be applied to the structural connection between the retaining wall and the screen wall. Further, place the following certification on the plan adjacent to the details: **I hereby certify that the wall details shown hereon are designed in compliance with the I.B.C., current edition, and that the details shown hereon conform to that design.** _____ **Registered Civil/Structural Engineer Date**	

Item	Requirement	Comments
47.	If Item 47 and/or 48 above apply, place the following as-built certification on the plan cover sheet: **AS-BUILT CERTIFICATION OF SITE WALLS** **I hereby certify that the walls and/or retaining walls shown herein have been inspected by me, or under my supervision, and that they have been constructed in conformance with the details shown on these plans.** _____ **Registered Civil/Structural Engineer Date** Offsite improvements will not be considered complete, and the Certificate of Occupancy will not be issued, until the above certification is properly executed.	
48.	Where applicable, show all site wall structural details on the plans.	

Please return this checklist with the next plan submittal

City Use Only

1. Buy-ins paid?
2. Zoning code landscaped area in front?
3. Review by City service supervisors needed?
4. Reimbursement Agreement
   A. Required
   B. Prepared